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(54) Title: GLOVES

(57) Abstract: A glove produced form a plastics material containing an evenly dispersed quantity of electro-magnetically detectable particles.

GLOVES

This invention relates to gloves and more especially to gloves whose presence can be detected electro-magnetically.

The wearing of gloves by operatives in manufacturing industries, such as pharmaceutical, food and tobacco industries, is important to protect products from contamination and to preserve the required high standards of hygiene and cleanliness. A consequence of this is that a glove or a relatively small piece of a glove caused, for example, by the glove snagging or being torn, may become detached from an operative's glove and be mixed with products being manufactured.

To meet this problem, it is accepted practice that operatives' gloves should be coloured blue and it is now a requirement in many countries that this procedure be followed so that gloves can be detected visually. Visual detection is not foolproof, particularly where small glove pieces are concerned.

Electro-magnetic inspection of products leaving a production line is undertaken as a matter of course in many industries. Such inspections enable metal-based foreign bodies present in otherwise non-metallic products to be detected. In this way, contaminated products can be selectively discarded. Operatives' gloves are generally produced from a polymeric substance (e.g. a plastisol) and their presence in a product would not at present be detected other than by visual inspection.

One object of the present invention is to provide a glove for use by operatives on, for example, manufacturing production lines which can be detected electro-magnetically in the event that it or a part thereof becomes mixed with products during the manufacturing process.

According to the present invention in one aspect, there is provided a glove produced from a plastics material containing an evenly dispersed quantity of electro-magnetically detectable particles.

The plastics material may be a plastisol such a natural latex, acrylonitrile-butadiene (nitrite) or polyvinylchloride (pvc). Typically, the gloves are produced by a process in which a glove-shaped former is immersed for a relatively short period of time in a solution of the plastics material. The solution may also include various additives such as stabilisers, accelerators and fillers. To produce a single glove, the former may be sequentially immersed two or more times.

In another aspect, there is provided a glove which includes an evenly dispersed quantity of a magnetically detectable material in particulate form.

The electro-magnetically detectable material is preferably in powder form, the average particle size of the powder preferably being between 1 and 200 microns. Typically, the average particle size is in the range 50 to 200 microns, preferably between 50 and 100 microns.

The electro-magnetically detectable material is preferably a ferrous material, more preferably ferrous oxide typically comprising γFe_2O_3. The material may consist solely of a single metallic substance e.g. a ferromagnetic or ferrimagnetic material, or it may comprise a mixture of two or more different electro-magnetically detectable materials including an iron-containing powder. Alternatively, the material may comprise a bronze alloy of copper with aluminium, manganese or beryllium. The alloy may be an alloy of copper and tin and may include other metals such as zinc or lead.

The electro-magnetically detectable powder is preferably mixed with the liquid plastisol to produce a relatively homogenous mix and the quantity of powder added preferably represents between 3% and 6% by volume of the mix. Typically, the quantity is of the order of 5% by volume. Homogenous distribution of the electro-magnetically detectable material allows even small fragments of a glove to be detected with conventional electro-magnetically operating detection equipment.

When the electro-magnetically detectable material is in powder form, then its type and particle size is preferably such as to be detectable in the frequency range 50 kHz to 600 kHz, which is a frequency range that is employed by conventional detection equipment. As

mentioned, the particle size of the majority of the powder is preferably below 200 microns, and would usually be above 1 micron. More preferably the particle size of the majority of the powder is in the range 50 to 200 microns and most preferably it is in the range 50 to 100 microns.

In use, the intimate presence of the electro-magnetically detectable powder within the glove material is sufficient to activate conventional detection equipment in the event that a glove or a relatively small part of a glove is present in manufactured products leaving a production line as set out in the appended claims.

It will be appreciated that the foregoing is merely exemplary of gloves in accordance with the invention and that modifications can readily be made thereto without departing from the true scope of the invention.

CLAIMS

1. A glove produced from a plastics material containing an evenly dispersed quantity of electromagnetically detectable particles.

2. A glove as claimed in claim 1 wherein the plastics material is a plastisol.

3. A glove as claimed in claim 2 which the plastisol is natural latex, acrylonitrile-butadiene or polyvinylchloride.

4. A glove of essentially plastics material which includes an evenly dispersed quantity of a magnetically detectable material in particulate form.

5. A glove as claimed in claim 4 wherein the electro-magnetically detectable material is in powder form, the average particle size of the electro-magnetically detectable powder being between 1 and 200 microns.

6. A glove as claimed in claim 5 wherein the average particle size is in the range 50 to 200 microns.

7. A glove as claimed in claim 6 wherein the average particle size is in the range of 50 and 100 microns.

8. A glove as claimed in any one of the preceding claims wherein the composition of the electro-magnetically detectable particles includes a ferrous material.

9. A glove as claimed in claim 8 wherein the ferrous material is an oxide of iron.

10. A glove as claimed in claim 9 wherein the material is ferrous oxide.

11. A glove as claimed in claim 10 wherein the ferrous oxide is γFe_2O_3.

12. A glove as claimed in any one of claims 1 to 11 wherein the composition of the particles comprises a mixture of two or more different electro-magnetically detectable materials.

13. A glove as claimed in any one of claims 1 to 7 wherein the composition of the electro-magnetically detectable material comprises a bronze alloy of copper with aluminium, manganese or beryllium.

14. A glove as claimed in claim 13 wherein the alloy is an alloy of copper and tin.

15. A method of producing a glove as claimed in any one of the preceding claims wherein the electro-magnetically detectable particles or powder is mixed with a liquid plastisol to produce a relatively homogenous mix, the quantity of electromagnetic powder or particles added to the liquid plastisol representing between 3% and 6% by volume of the mix.

16. A method as claimed in claim 15 wherein the quantity is of the order of 6% by volume.

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 922 482 A (DE RICCI SOPHIE ET AL) 13 July 1999 (1999-07-13) column 1, line 4 - line 22 column 1, line 62 -column 2, line 8 column 2, line 16 - line 18 column 4, line 61 - line 67 column 6, line 6 column 6, line 64 - line 65	1-11
Y	column 7, line 32 - line 35; claims 1,3	12,15,16
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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	US 4 937 995 A (DEFFEYES ROBERT J ET AL) 3 July 1990 (1990-07-03) column 2, line 40 - line 52 column 8, line 13 - line 40; claims 11,15,16	15,16
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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